

How DID I  
GET  
HERE?

BLIZZARD



Honiga clownfish



44.2  
[n3v3@mp0r'e]

I don't believe

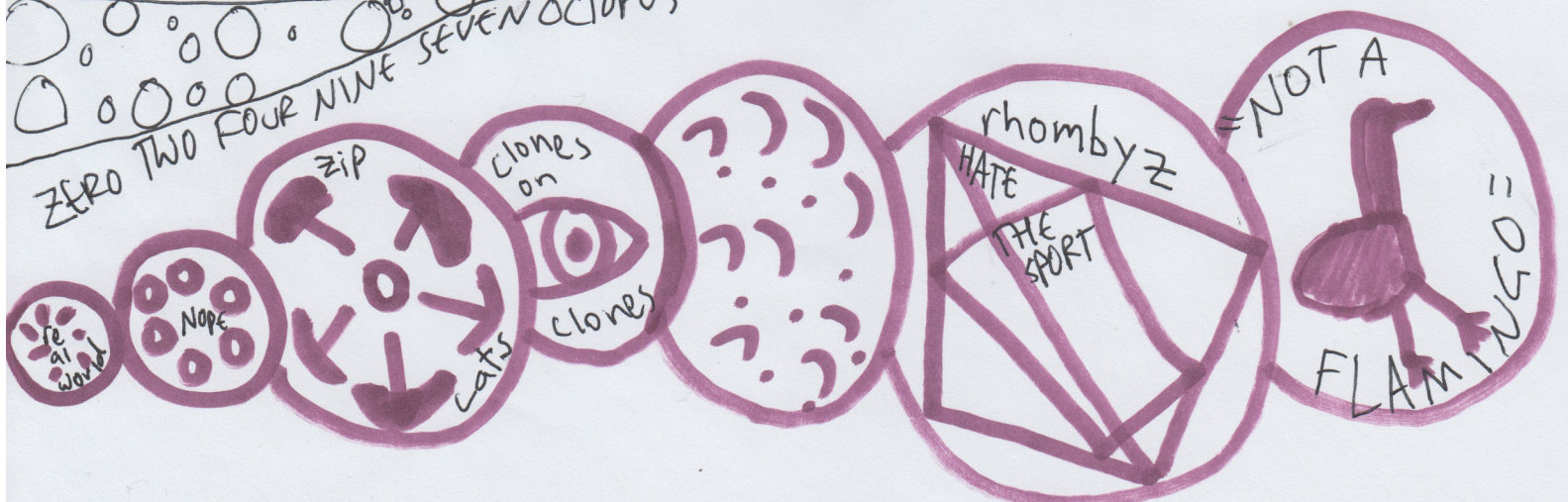
I am so sorry  
for this  
Chaos

(n)



AMEN

ZERO TWO FOUR NINE SEVEN OCTOPUS





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### Speak

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### Staff Box:

B Corfman - Pillars of Ice Cream atop a Fruity Sea

Grace Willey - Reality

Jess Ide - Sodexo-Bon Appetit Merger

Jonathan Gardner - Six Flavors of Orange Ice Cream

Nora Miller - Wafflepocalypse

Alex De Strulle - Dairy Dairy Everywhere

Tom Howe - What's Happening

Siqi Lu - Spaghetti Dumplings

Rowan Lupton - Going Back

Cliff Robbins - Everything Made of American Cheese

Asa ????? - a Siruplerghallle Chery Deruix Evoff of Orum

Submissions are due always, constantly, so submit forever. You can submit in rich text or plain text format by CD, Flash Drive, singing telegram, carrier pigeon, paper airplane, Fed-Ex, Pony Express, or email. Get your submissions to [omen@hampshire.edu](mailto:omen@hampshire.edu), or Grace or B's mailboxes (735 and 1666)

## Policy

The Omen is a biweekly publication that is the world's only example of the consistent application of a straightforward policy: we publish all signed submissions from members of the Hampshire community that are not libelous. Send us your impassioned yet poorly-thought-out rants, self-insertion fan fiction, MS Paint comics, and whiny emo poetry: we'll publish it all, and we're happy to do it. The Omen is about giving you a voice, no matter how little you deserve it. Since its founding in December of 1992 by Stephanie Cole, the Omen has hardly ever missed an issue, making it Hampshire's longest-running publication.

Your Omen submission (you're submitting right now, right?) might not be edited, and we can't promise any spellchecking either, so any horrendous mistakes are your fault, not ours. We do promise not to insert comical spelling mistakes in submissions to make you look foolish.

Your submission must include the name you use around campus: an open forum comes with a responsibility to take ownership of your views. (Note: Views expressed in the Omen do not necessarily reflect the views of the Omen editor, the Omen staff, or anyone, anywhere, living or dead.)

The Omen staff consists of whoever shows up for Omen layout, which usually takes place on alternate Thursday nights in the basement of Merrill in the company of a computer with an extremely inadequate monitor. You should come. We don't bite. You can find the Omen on other Thursdays in Saga, the post office, or on the door of your mod.

THE OFFICIAL OMEN HAIKU:

**Views in the Omen (5)**

**Do not necessarily (7)**

**Reflect the staff's views (5)**

# EDITORIAL

B Corman | Grace Willey

Hello Omen Readers,

This editorial is going to be a little weird. My life has been very strange, and suffice it to say that I am the equivalent of drunk right now despite not drinking alcohol or taking any other form of drug.

So really, I'm just going to talk about whatever the hell I want and fill this space. Does anyone read this? I'm pretty sure no one does; Grace just said "The butt sticking out of the prison cell."

Anyone looking forward to valentine's day? I printed out egg valentines on the color printer on the third floor. There's also this weird publication we found in the Omen Office called the Blunderbuss. It's. really fucking strange.

I've got this new aloe plant in my room - it was in the CLA office, dying of what I'm guessing was root rot. Cleaned it up, trimmed it, let it callus over, and now it's sitting in a pot and I'm waiting for it to root. All very exciting!

And finally, can we talk about Jupiter Ascending? That movie is absolutely ridiculous and I'm so glad I went and saw it. There's a ton of weird bee symbology, space capitalism, and just - the gravity boots were SO CHEESY. I mean, everything was cheesy, but the gravity boots. seriously. And just, the whole premise/'recurrence' thing was so absurd and I loved it.

See you next time, dear Omens.

Your Co-Editrix,  
- B

Hello readers,

Winter is hard. You wake up each morning to an endless void of white and grey barring down on you. Your bones sting whenever you walk outside and even the Earth below your feet has exchanged it's usual heartbeat for a certain hollowness reminiscent of empty hospital corridors. You trudge on as you always have, but with each fall of snow, each frozen hair, that sour ache in your chest is folds deeper and deeper into your ribs until you don't think you can bear to have a heartbeat any longer. Just as you are about to throw your heart off of a Prescott balcony, you remember the cool breeze of a late summer morning in Sonora as you walked down Washington Street with your parents and aunts and uncles. It was the morning after your grandfather's wake.

There was a diner called "The Miner's Shack" and you and your cousins split thick spongy pancakes drenched in synthetic syrup. All along the walls were rusting pans and pick axes, yearning for the hardships of old. Men in black and white photographs smiled with their prized nuggets, as if it had been worth all the scurvy and worms in the grain.

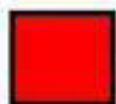
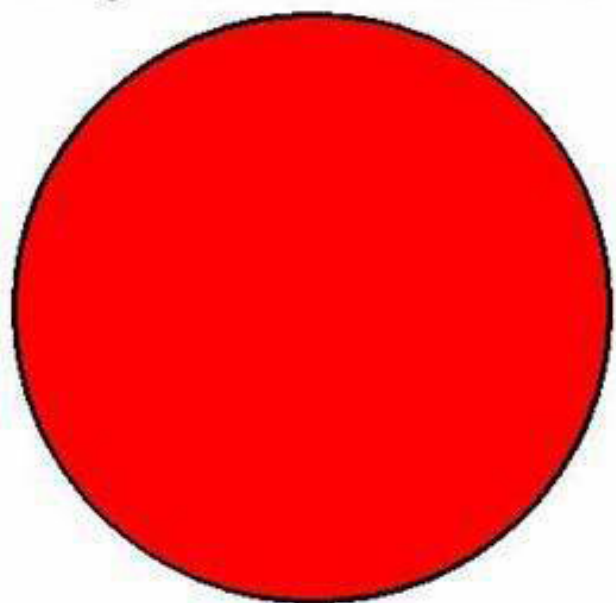
All you wanted was the ease of not seeing an empty house when those high up mountains got snowy. The quiet hum of an old man who planted daffodils in a garden beneath the pines and firs was so close you thought he was sitting with you at that greasy diner. You pretended you could see his hands running over the plastic checkered tablecloth. Spotted hands that prepared meals from French Cookbooks and clacked domino tiles across a card table- they were the same hands that taught you how to pick up a brush. They seem so near and yet now they are surely far away, never to paint again.

In the darkest nights of winter you remember it all and rummage through your drawers to find your brushes and the same watercolor set he gave you for your ninth birthday. A man of good taste, the paints are still good after all these years. The brush touches the water, then the pigment, and then the page and in a single stroke you have brought the dead back to life.

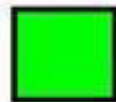
Grace Willey  
Co-Editor

# Section Speak

Things Meat Loaf would do for love



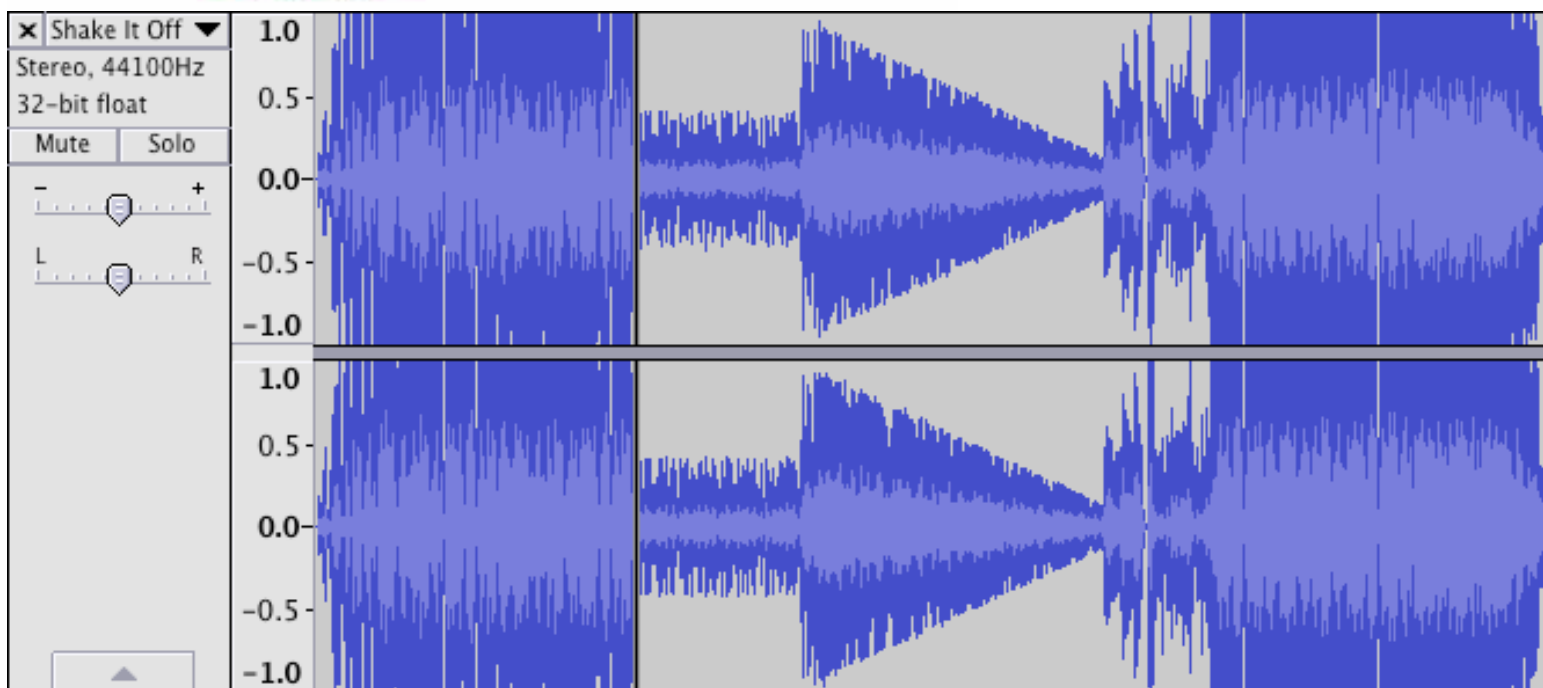
Anything



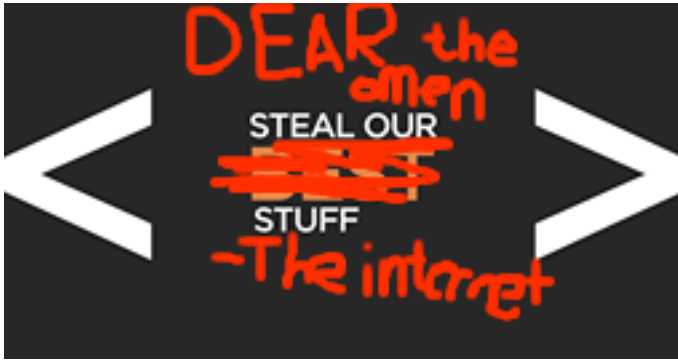
That

Y'all sure didn't have opinions this week, c'mon, have opinions! We're having to recycle opinions!!! - Jess

< Cliff Robbins  
v Rowan Lupton

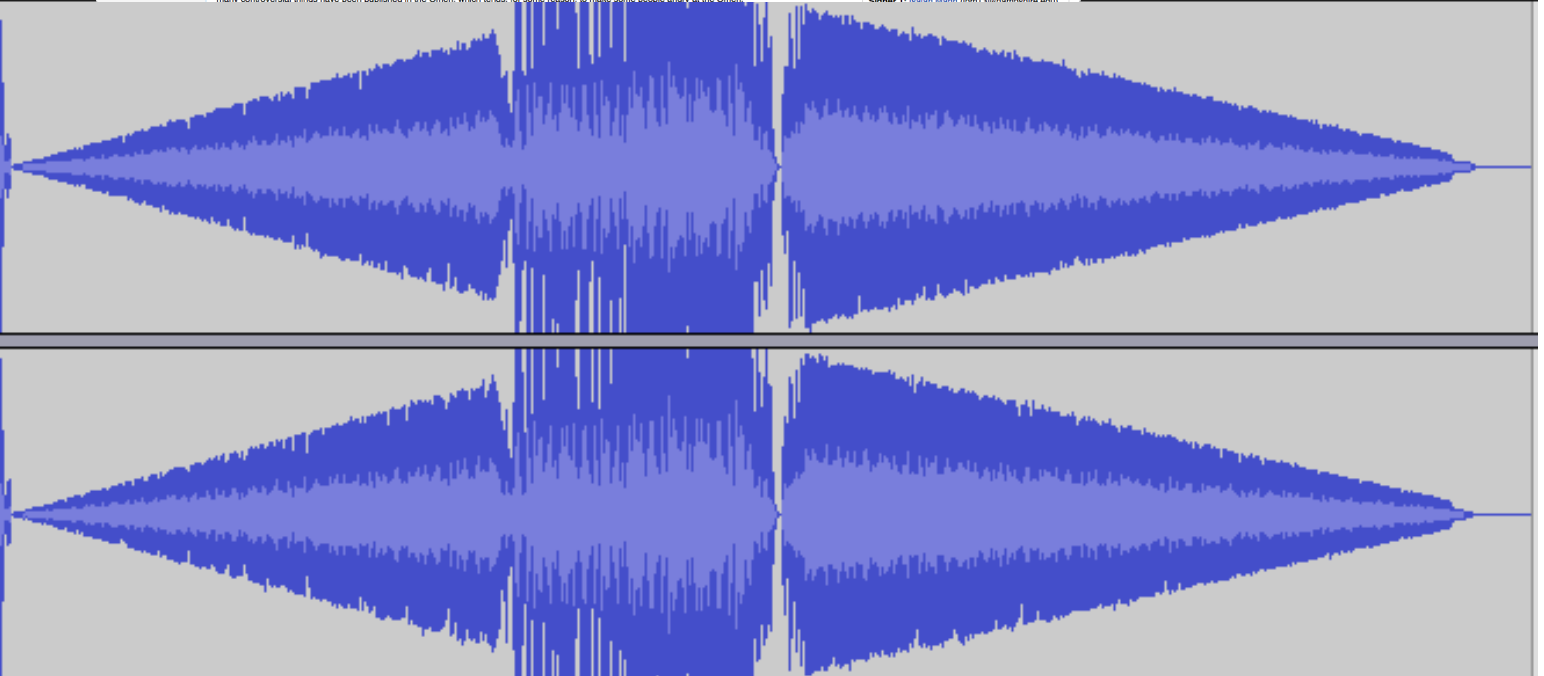






“A previous Hampshire newspaper, the Forward, actually contained more content downloaded from the Internet, on average, than the Omen did.”

< Rowan Lupton ^ v



# EAT MY SHORTS, GREG PRINCE

## FUCK RALPH HEXTER

OH MY GOD RALPH HEXTER IS THE WORST PRESIDENT OF HAMPSHIRE UGH HE NEEDS TO BE IMPEACHED LIKE CAN YOU BELIEVE HE'S GOING TO MOVE ADMISSIONS INTO ASH??? WHERE WILL WE PUT THE COMPUTERS!!! THERE'S SO MANY OF THEM!

WE NEED TO REHAMP! RERADICALIZE! HEXTER IS MOVING FORWARD WITH THE ASH ADMISSIONS PROJECT ANYWAY WE NEED TO GET IN THE WAY OF THOSE BULLDOZERS FUUUUUCK can you BELIEVE he fired those STAFF??? UGH Steven FUCKING weiSLER!!!

-Jess Ide F06



Rowan Lupton F08

-Jess Ide F83

You may have heard of the FISH COMMITTEE. The anonymous group of students who have been leaving rotting fish by President Adele Simmons' office? I'M ALL FOR THEM! How dare she refuse to divest from nuclear arms! Have we all forgotten about nuclear disarmament? Sure the Soviets might be off our backs but nukes are still terrible! I say we impeach her at the upcoming all-community meeting! She's castrating Community Council! Let's join the FISH committee is leaving rotting fish around campus! Let's see what Adele Simmons thinks of that!!!

Oh my god did you hear about Greg Prince's new pet policy?! Why can't we have pets anymore! He is such a buzzkill! He makes agreements and backs out! For is? And they want ME to shake GREG PRINCE'S HAND at COMMENCEMENT? AS IF. Boycott Course Pre-Registration! Those lines are waay too long! OH YEAH ALSO DID I MENTION HOW HE'S KILLING DIV 1? NO MORE INDEPENDENT PROJECTS IN THE SCHOOLS?! THIS IS THE DEATH OF INDIVIDUAL LEARNING! WE MIGHT AS WELL ALL BE DRONES! Oh and by the way he bought that \$10,000 bible?!? why?!?! Boycott Commencement!!!

Dankly,  
Jess Ide F99

## BITE ME, ADELE SIMMONS



Well, the Hampshire hubbub seems to have died down, so I thought I'd post something. I'm at UC Davis. Please PLEASE for the love of God take this pompous incompetent back into your fold. I'm begging you. Please. The administrative gifts he may have lavished on your institution he is now lavishing on us in spades. And it's driving us to a level of mediocrity that will takes years to fix.

^Rowan Lupton found this in the comments of an article about how Hexter wasn't that bad



**FStewz**

· 1m

THEY HAVE SUCH A HUGE  
PRINT RUN, WHY BOTHER, NOBODY READS IT.



[View conversation](#)



**FStewz**

· 2m

"THE CLIMAX KEEPS  
LEAVING THEIR DAMN PAPERS ALL OVER FPH."



[View conversation](#)



**Evan @silby** · 4h

ugh, is hexter really upping the incoming class size? we don't have the room!



**Evan @silby** · 4h

I guess this Marlene Gerber Fried is doing a pretty good job as president.  
Who's this JLash guy I keep hearing about?



^Jess Ide ermm.. I mean.. Evan Silberman former editor of The Omen circa 2008



CAPRICORN (Goat)  
December 22 - January 19

i mistook you for an angel you were an armchair with my  
thighs and palms stuck to the upholstery

i will do things which serve me

i will try to perceive it when it is quiet in the absence of  
sound and sleeping in the air brushing flecks of it off my  
shoulder

(blood should hum)

((seek out thirstily what moves yr blood))

repeat x10 in the mirror every morning



PISCES (Fish)  
February 19 - March 20

pay more attention to borders the ways that they are dark the way  
dark can be dangerous & sensuous & sweet & brittle & looming &  
gentle & comforting & menacing

but why should touch end at any border

who

designated such importance to such an arbitrary thing as skin

rub til the chemicals are clean



TAURUS (Bull)  
April 20 - May 20

you are so very appreciated by everyone around you  
you are just glowing / overflowing with warmth all the time and i  
hope you feel even a fraction of the warmth & safety you create  
for the people you love

u angel u angel u angel u angel

you are an absolute fucking sunflower even when you are  
unaware of it



AQUARIUS (Water Bearer)  
January 20 - February 18

just stop it with the arhythmic bullshit

at the intersection the piano hands turn suddenly right; the music  
halts abruptly

in a few months i bet youre gonna peel off your sweaters and jackets to  
find that old floral pattern growing on your flesh



ARIES (Ram)  
March 21 - April 19

owning stuff is tite

ty based capitalism



GEMINI (Twins)  
May 21 - June 20

if you watch the trajectory of the sun all day  
you may notice that it soars in the only possible  
inevitable shape of its soaring it settles in the  
unalterable immovable nest of its setting

(with you its the same)





i always knew there was a strong resemblance & ive told you so many times & im not sure why i wasnt worried about this when i went to meet with him i should have known id be looking at your face again  
i blushed so hard i wasnt prepared for it  
i was looking at his aging face and seeing yours in bed again your face and mannerisms on a man with hair beginning to gray  
im not sure you can imagine yourself past your twenties either i know youve been thinking about death since you were very young i love the guilt of imagining you in your thirties with a kid and without this particular shade of sad every part of me is burning to try and tell you except for something heavy like the entire weight of teeth on my shoulders which will allow me to stop myself fuck



after almost twenty years of marital bliss, methods of organizing the mail still evade them



youre a lot like buying a new brand of cigarettes (the ones that taste the way i imagine my friends mouth) and the unequalled cardboard pleasure of holding a new shape in my hand / pocket / hand / pocket / hand / pocket

youre a lot like the feeling of thin strips of paper burning and the ash, caught by chance on the wind, which you could later pluck out of my hair like a mother



extravaganja 2015 baby

i had a scheduling conflict last year but they wanted me to be the king of the festival



all the possibilities of what you do and do not eat

sucking on the taste of bones

you secretly contain all the types of platonic touching i want (if only as a way to simmer in / to spit out the impulse to wrap myself around charred logs)

fill up a bathtub & let warm water touch you



you taste like uncomfortable sweat  
blood on my forehead in the bathroom  
the dazed, blunt swimming ceiling feeling of ignoring trauma except as peripheral  
you taste like ham on rye  
and i wanna throw you into the charles river and watch until the pages are illegibly soggy or your circuitboard cuts out

★ **I'd like to hire a lesbian for part time titfucking (southampton)**

We can all agree, physically speaking, titfucking is one of the safest sex acts. Given that and the general consensus from straight women that it's a boring but sometimes necessary evil, I'd like to hire someone that wouldn't hide the fact that it bores them and also wouldn't be prone to "catch feelings" in the process. You're age, race, description, is all irrelevant to me; heck you can even curse me out under your breath while on the job, just so long as you have an ample enough bosom to perform the task at hand. if you have a partner that you'd feel more comfortable with if they accompanied you, that's fine. we can literally write the book on how to approach this, and I want to emphasize this is not born of shaming or slander in any way, it's just bodies and capitalism. I'm 100% sincere about this so if you're reading this with an eyebrow raised, contact me with your resume and guidelines and we can discuss details from there

- do NOT contact me with unsolicited services or offers

## Joan Eve, Lesbian Tit-Fuckee

5670 Corn St, Northampton, MA, 1060,

[Tits4Lyfe413@comcast.net](mailto:Tits4Lyfe413@comcast.net)

413-459-5555

### Work Experience

Tit-Fuckee, Freelance, Some Guy on Craigslist, Hadley, MA, December 2014

- Got tit fucked by some guy on craigslist
- Did not catch any feelings for him
- Cleaned up after

Tit-Fuckee Supporter, Freeland, some other dude, Greenfield MA, November 2014

- Supported girlfriend in getting tit-fucked
- helped clean her
- wrote the book on how to do this shit

**Telephone Interviewer**, Abt SRBI, Hadley, MA, October 2014 to November 2014

- Administiered telephone interviews for government and non-profit organizations

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Submitted by Jess Ide





<- Submitted by Carter Everett who doesn't even go here???? but like jess is submitting it on his behalf who cares



^Tom Howe      Nora Miller v



Rowan Lupton ^v



# SECTION LIES

## Content Warning: Abuse, Slurs

*The complete and total collapse ~Jess Ide*

### I

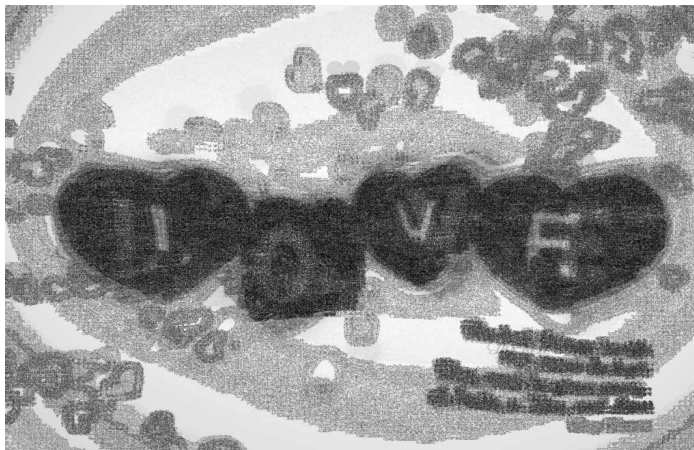
Bad people are real  
I thought they were mythical  
like sea serpents  
but they're real

I thought I was a mountain goat  
standing on the edge  
trying to become a bird

The total collapse  
of the cliff  
I realized  
I was a potted cactus  
falling off  
and nobody could catch me  
because of the spines I grew  
thinking they were wings

### II

The complete  
the end  
The snowball rolling down a hill  
I thought it would protect me  
I didn't think I thought I was safe until I didn't  
it was smashed  
my shield of lies  
so now i lie  
down hoping  
to be left alone



### III

family was assigned to me  
i didnt ask to be born  
with eyes that saw separately  
a tongue that wont fit  
a brain that wont rest  
breasts that didnt leave  
feet that flatten  
nails that pick  
legs that jitter  
these things are all my fault  
it was my fault when i told the truth  
it was my fault when i lied  
whether something is my fault has nothing to do  
with if i did anything  
i was a very responsible eight year old

### IV

why wont you talk to me  
why dont you tell me things  
why didnt you tell me  
why do you keep these things to yourself  
why did you do that  
why do you feel that way  
why dont you want me to touch you  
why dont you think we'd be accepting  
why dont you love us  
why dont you love me  
why do you say that  
why cant i touch you  
why dont you want to spend time with me  
why do you like them more than me  
why do you think the witch was an abusive mother  
why did you run away  
why did you ignore my texts  
why did you ignore my emails  
why did you ignore my calls  
why wont you come home  
why dont you love me

### V

What is love  
please dont hurt me  
dont hurt me  
stop hurting me  
please





**VI**

I hate meeting my friends' parents.  
If they're bad then I feel bad for thinking mine are  
bad  
they ask me if I'm grateful I don't have parents so  
awful as my friends  
I can't say that they're not any better  
If they're good parents it's worse  
is that how parents are supposed to be?  
Is that a thing mothers and fathers and brothers  
do?  
Is it possible for people to love their families and  
look forward to seeing them?  
Was that something I was supposed to have?

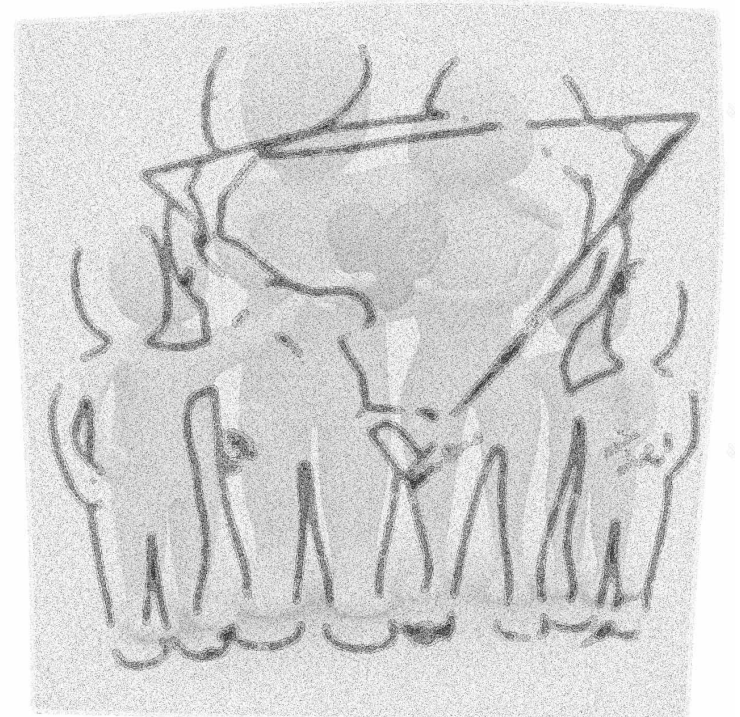


**VII**

There are bad people in the world  
I cannot defend myself through guilt-trips and  
forced sympathy  
They hear that my brother has hit me  
he things faggots are gross  
he things trannies are disgusting freaks  
he thinks the government is after him for smoking  
weed and building huts out of old tires  
They tell him I'm a tranny and who claims he hit  
me  
How dare I be happy

**VIII**

Why did you say that  
What did you do  
It must be your fault  
Why do we pay for that college of yours  
What happened to you  
Why don't you remember how I wrapped you in a  
blankie and rocked you to sleep  
Why don't you know that I love you  
Why don't you feel that I love you  
How about a conference call  
How about we visit this weekend  
Do you wish you had a different body  
What can be done to fix you

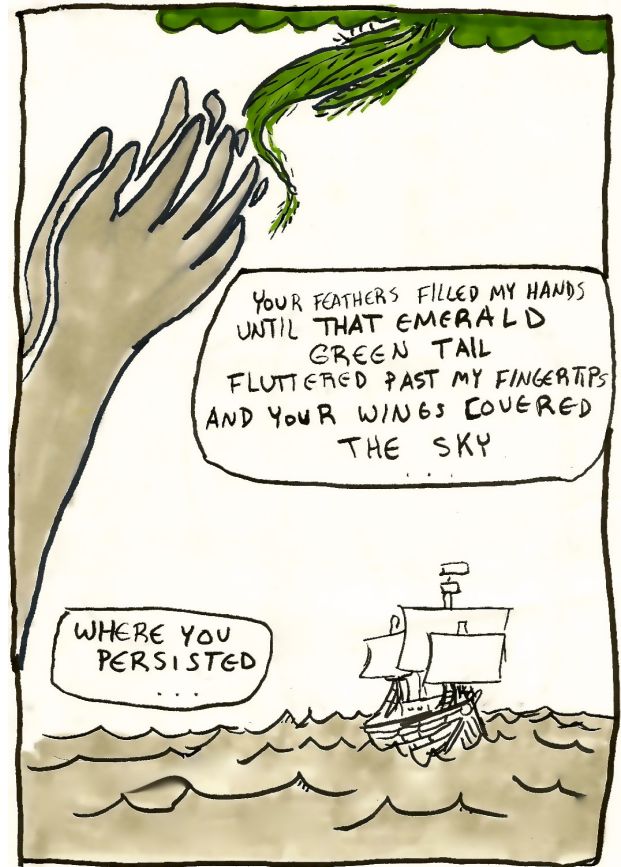




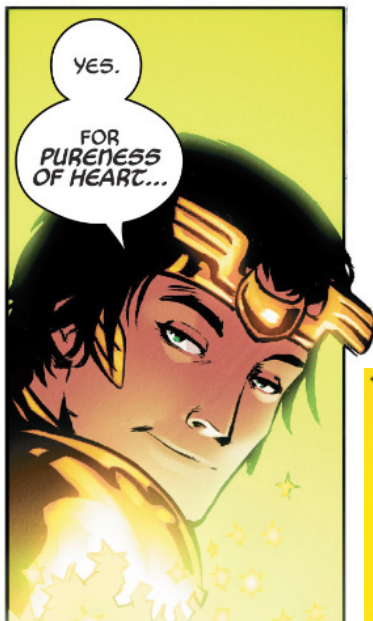
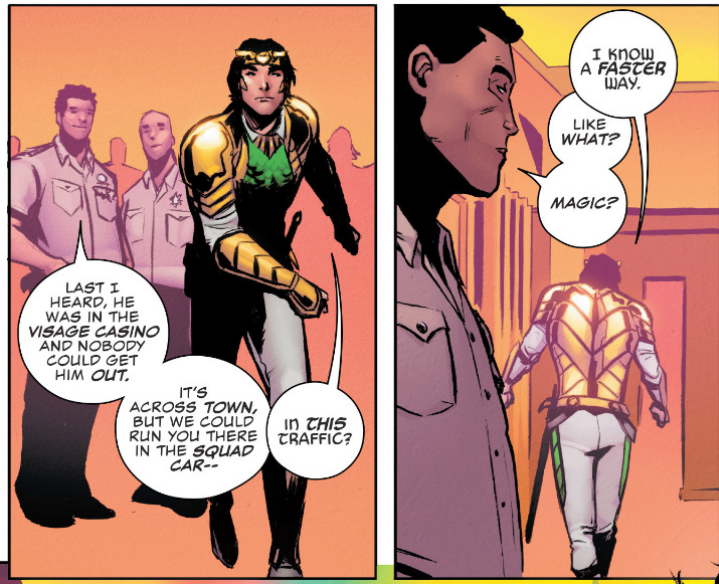
It started  
with a fall  
of feathers ...











Submitted by B Corfman





Whreeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee  
hi I'm

cliff joined the omen y'all he made  
this page isnt it neat

Cliff wheeeeeeee  
in the  
Whreeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee  
omen wheeeeeeeeeeee

Is this a haiku?

It can be if you say two

syllables really fast

-Cliff Robbins



**The Rock Finally Reveals How He Got 300% Bigger**  
This steroid alternative has celebrities exploding in size




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**Why Was This Video Banned?**



She Is  
Over 50

Your Last Chance To Watch It...

**SAVE THE INTERNET**



**Top 10 Cancer Causing Foods You Eat Every Day**

NaturalON



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**NASA Hides The Truth for 60 Years**


Cool Gallery



y via The Richest via A



Dogs That Will Hurt Your Children  
via Punny Toon



10 Vi That Rele:



birdcup  
.com

ON SALE

1st year \$2.99\*  
Additional years \$14.99\*

~~\$14.99\*~~ **\$2.99\***  
when you register for 2 years or more.

SELECT

Signup Code

Optional

This field is required.

Barack Obama wants gamers



Submitted by Jess Ide

## The Great Omen Choose-Your-Own-Adventure Novel!

by the award-winning young adult novelist Jonathan Gardner

You wake up in your office cubicle. The digital clock on your desk flashes 11:39 P.M. You suppose you must have somehow fallen asleep at work; it's strange that no one woke you up, though. Rubbing the sleep from your eyes, you stand up and stretch. Computer monitors glow from all around the office. That's also strange, you think. Usually the boss is such a stickler about not wasting electricity. You hold down the power button on your own computer for a few seconds. Ten seconds. Thirty seconds. It remains powered on, the screen defiantly glowing white.

Must be some weird glitch in the system, you guess. That would explain why all the other computers are on, too.

You pick up your bag from beneath your desk and put on your jacket. No sense in sticking around here longer than necessary. You already have an hour's commute back home ahead of you. You make your way to the door and pull on the handle, but it barely budge. Locked. You could've sworn that there was a latch on the door, but now you can't find it for some reason.

Frowning, you pull out your cell phone and dial the front desk in the hopes that security or the janitor will answer. You hear the phone ringing out front, but no one picks it up.

Locked in the office. Great.

You return to your cubicle to think of a way out. As you sit, though, something appears on your

computer screen:

# SUBMIT

If you would like to type "What?", turn to page 11 in The Omen, Volume 44, Issue 4.

If you would like to run away and try to escape out the window, turn to page 15 in Volume 44, Issue 3.

## **Snowpoclse by Alex de Strulle**

All I see is white, shining, simmering, glowing white. Perhaps I should remove my face from the window, ah, much better. Now I can see my room, it is a mess and I should clean it.

My friends the snowpocolypse has not resented it's wrath. It is now the year 2017 and we have all been trapped on this wretched campus. Anarchy has broken out, J-Lash has fallen, and Greenwich has burned to the ground (you would think people would learn not to warm clothing in microwaves).

Many of us have turned into bloodthirsty savages, craving nothing but sex, weed, and the occasional morsel of food. Since Greenwich has burned many former residents have taken to over occupying the elite Enfield mods.

Shortly after the incident occurred Enfield fortified itself against the final mod, Prescott and the dorms. I have no seen some of my good friends for quite some time, my heat aches particularly for my best friend Sir Muffinman. If this reaches you, I will have you know you are a nerd.

Thankfully most who are close to me are dorm side and thus have been my only means of sanity and survival. There are tales of those who have braved the storm and gotten out... They are not to be believed.

There is an airdrop arriving shortly, I must join my faction of Dakinites to help retrieve it. This isn't the first time I've risked myself for the sake of my fellows, but Merrill has failed in their last attempts. I fear they will be particularly brutal.

Thus to my Dakin friends, I ask you to keep this record sacred, so that one day someone will know of what happened. We must never forget the aftermath of the great snowpocolypse.



submitted by Tom Howe



# Section Hate

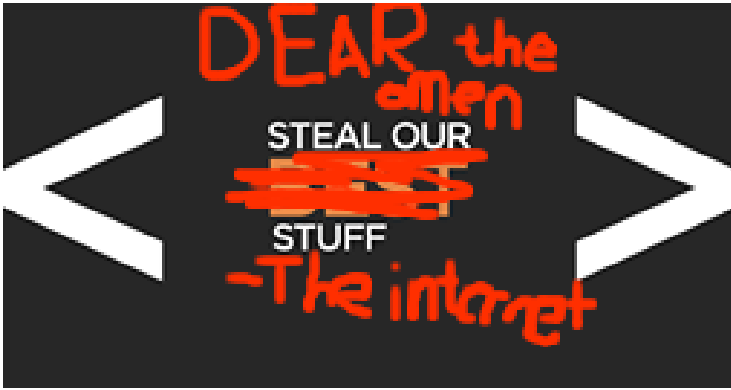


Submitted by Cliff Robins



submitted by Tom Howe v





^Tom Howe

submitted by Rowan Lupton v ^>

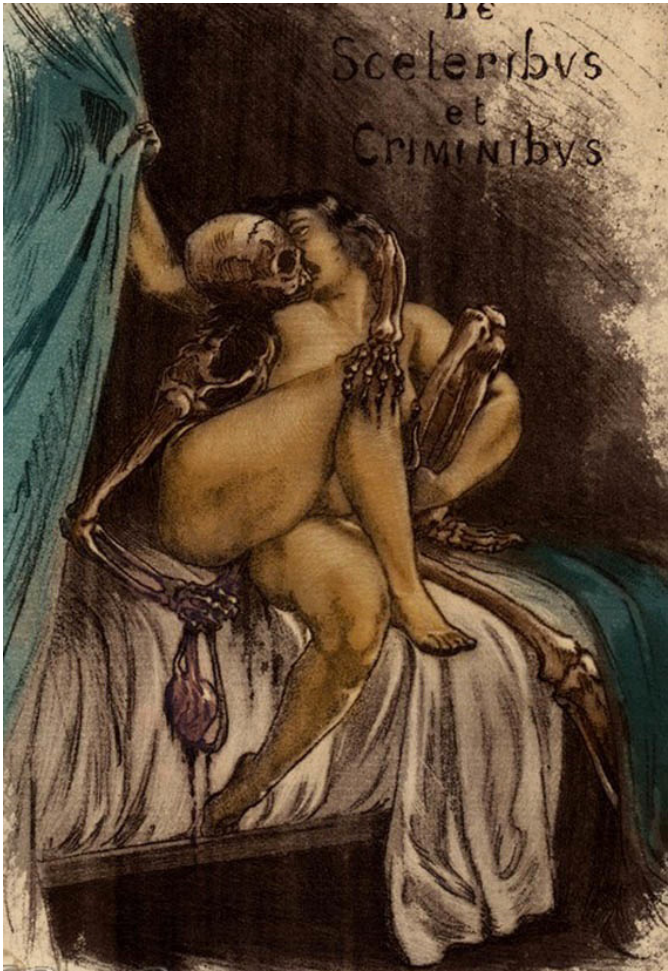






< Submitted by Grace Willey ^>









Submitted by Grace Willey



^Rowan Lupton

submitted by tom howe

hydrogen 1 <b>H</b> 1.0079 lithium 3 <b>Li</b> 6.941 sodium 11 <b>Na</b> 22.990 potassium 19 <b>K</b> 39.098 rubidium 37 <b>Rb</b> 85.468 cesium 55 <b>Cs</b> 132.91 francium 87 <b>Fr</b> [223]		beryllium 4 <b>Be</b> 9.0122 magnesium 12 <b>Mg</b> 24.305 calcium 20 <b>Ca</b> 40.078 strontium 38 <b>Sr</b> 87.62 barium 56 <b>Ba</b> 137.33 radium 88 <b>Ra</b> [226]		<table><tr><td>boron</td><td>carbon</td><td>nitrogen</td><td>oxygen</td><td>fluorine</td><td colspan="11"></td><td>helium</td></tr><tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td colspan="11"></td><td>2</td></tr><tr><td><b>B</b></td><td><b>C</b></td><td><b>N</b></td><td><b>O</b></td><td><b>F</b></td><td colspan="11"></td><td><b>He</b></td></tr><tr><td>10.811</td><td>12.011</td><td>14.007</td><td>15.999</td><td>18.998</td><td colspan="11"></td><td>4.0026</td></tr><tr><td>aluminum</td><td>silicon</td><td>phosphorus</td><td>sulfur</td><td>chlorine</td><td colspan="11"></td><td>neon</td></tr><tr><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td colspan="11"></td><td>10</td></tr><tr><td><b>Al</b></td><td><b>Si</b></td><td><b>P</b></td><td><b>S</b></td><td><b>Cl</b></td><td colspan="11"></td><td><b>Ne</b></td></tr><tr><td>26.982</td><td>28.086</td><td>30.974</td><td>32.065</td><td>35.453</td><td colspan="11"></td><td>argon</td></tr><tr><td>gallium</td><td>germanium</td><td>arsenic</td><td>selenium</td><td>bromine</td><td colspan="11"></td><td>18</td></tr><tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td colspan="11"></td><td><b>Ar</b></td></tr><tr><td><b>Ga</b></td><td><b>Ge</b></td><td><b>As</b></td><td><b>Se</b></td><td><b>Br</b></td><td colspan="11"></td><td>krpton</td></tr><tr><td>70</td><td>72.61</td><td>74.922</td><td>78.96</td><td>79.904</td><td colspan="11"></td><td>83.80</td></tr><tr><td>cadmium</td><td>indium</td><td>tin</td><td>antimony</td><td>iodine</td><td colspan="11"></td><td>xenon</td></tr><tr><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td colspan="11"></td><td>54</td></tr><tr><td><b>Zn</b></td><td><b>Ga</b></td><td><b>Ge</b></td><td><b>As</b></td><td><b>Se</b></td><td colspan="11"></td><td><b>Xe</b></td></tr><tr><td>65.38</td><td>69.723</td><td>72.61</td><td>74.922</td><td>78.96</td><td colspan="11"></td><td>131.29</td></tr><tr><td>silver</td><td>cadmium</td><td>indium</td><td>tin</td><td>antimony</td><td colspan="11"></td><td>astatine</td></tr><tr><td>107.87</td><td>112.41</td><td>114.82</td><td>118.71</td><td>121.76</td><td colspan="11"></td><td>86</td></tr><tr><td>196.967</td><td>200.59</td><td>204.38</td><td>207.2</td><td>208.98</td><td colspan="11"></td><td><b>Rn</b></td></tr><tr><td>gold</td><td>mercury</td><td>thallium</td><td>lead</td><td>bismuth</td><td colspan="11"></td><td>[222]</td></tr><tr><td>79</td><td>80</td><td>81</td><td>82</td><td>83</td><td colspan="11"></td><td></td></tr><tr><td><b>Au</b></td><td><b>Hg</b></td><td><b>Tl</b></td><td><b>Pb</b></td><td><b>Bi</b></td><td colspan="11"></td><td></td></tr><tr><td>196.967</td><td>200.59</td><td>204.38</td><td>207.2</td><td>208.98</td><td colspan="11"></td><td></td></tr><tr><td>unnilium</td><td>ununium</td><td>unbinium</td><td>ununium</td><td>unhexium</td><td colspan="11"></td><td></td></tr><tr><td>110</td><td>111</td><td>112</td><td>114</td><td>115</td><td colspan="4"></td></tr></table>	boron	carbon	nitrogen	oxygen	fluorine												helium	5	6	7	8	9												2	<b>B</b>	<b>C</b>	<b>N</b>	<b>O</b>	<b>F</b>												<b>He</b>	10.811	12.011	14.007	15.999	18.998												4.0026	aluminum	silicon	phosphorus	sulfur	chlorine												neon	13	14	15	16	17												10	<b>Al</b>	<b>Si</b>	<b>P</b>	<b>S</b>	<b>Cl</b>												<b>Ne</b>	26.982	28.086	30.974	32.065	35.453												argon	gallium	germanium	arsenic	selenium	bromine												18	31	32	33	34	35												<b>Ar</b>	<b>Ga</b>	<b>Ge</b>	<b>As</b>	<b>Se</b>	<b>Br</b>												krpton	70	72.61	74.922	78.96	79.904												83.80	cadmium	indium	tin	antimony	iodine												xenon	30	31	32	33	34												54	<b>Zn</b>	<b>Ga</b>	<b>Ge</b>	<b>As</b>	<b>Se</b>												<b>Xe</b>	65.38	69.723	72.61	74.922	78.96												131.29	silver	cadmium	indium	tin	antimony												astatine	107.87	112.41	114.82	118.71	121.76												86	196.967	200.59	204.38	207.2	208.98												<b>Rn</b>	gold	mercury	thallium	lead	bismuth												[222]	79	80	81	82	83													<b>Au</b>	<b>Hg</b>	<b>Tl</b>	<b>Pb</b>	<b>Bi</b>													196.967	200.59	204.38	207.2	208.98													unnilium	ununium	unbinium	ununium	unhexium													110	111	112	114	115				
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\*Lanthanide series

lanthanum 57 <b>La</b> 138.91	cerium 58 <b>Ce</b> 140.12	praseodymium 59 <b>Pr</b> 140.91	neodymium 60 <b>Nd</b> 144.24	promethium 61 <b>Pm</b> [145]	samarium 62 <b>Sm</b> 150.36	europtium 63 <b>Eu</b> 151.96	gadolinium 64 <b>Gd</b> 157.25	terbium 65 <b>Tb</b> 158.93	dysprosium 66 <b>Dy</b> 162.50	holmium 67 <b>Ho</b> 164.93	erbium 68 <b>Er</b> 167.26	thulium 69 <b>Tm</b> 168.93	ytterbium 70 <b>Yb</b> 173.04
actinium 89 <b>Ac</b> 227	thorium 90 <b>Th</b> 232	protactinium 91 <b>Pa</b> 231.04	uranium 92 <b>U</b> 238.03	neptunium 93 <b>Np</b> [241]	plutonium 94 <b>Pu</b> [244]	americium 95 <b>Am</b> [243]	curium 96 <b>Cm</b> [247]	berkelium 97 <b>Bk</b> [247]	californium 98 <b>Cf</b> [251]	einsteinium 99 <b>Es</b> [252]	fermium 100 <b>Fm</b> [257]	mendelevium 101 <b>Md</b> [258]	nobelium 102 <b>No</b> [259]

submitted by cliff robbins v



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# Modeling Evolutionary Programming:

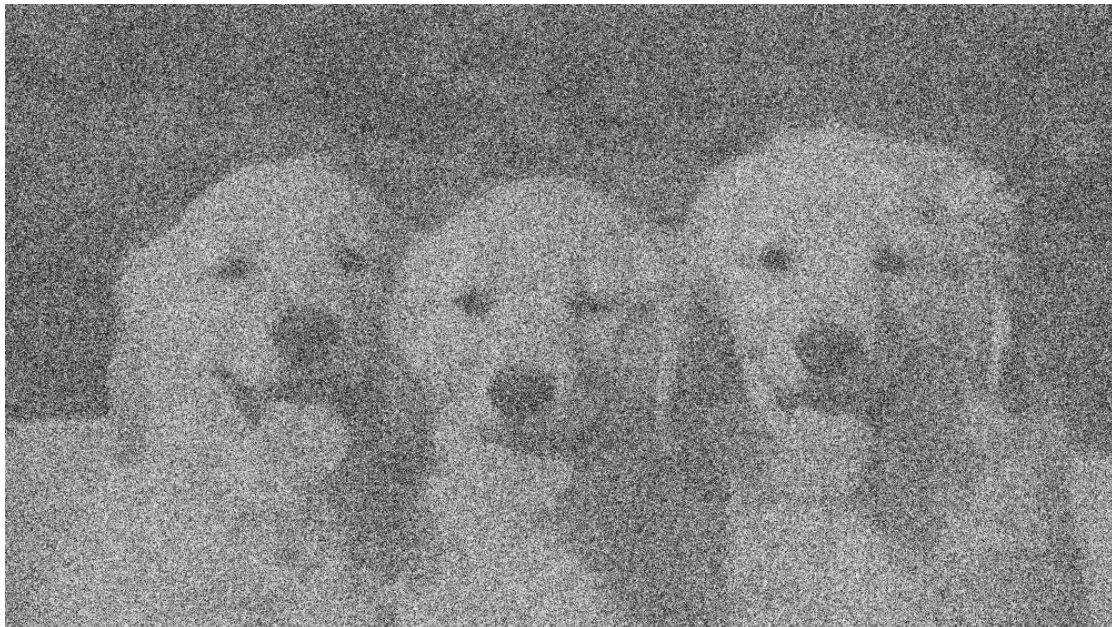
## Effective Implementation and Problem Selection

Evolutionary programming is used more and more frequently to find algorithms and solutions to problems – code entities are pitted against each other, gauged for fitness, and recombined in the next generation. This has led to efficient solutions to difficult problems; large scientific enterprises such as NASA use evolutionary programming to answer such varied questions as the occurrence of solar flares and the most efficient antenna designs.

Which questions, then, is evolutionary programming not only capable of solving, but suitable for – and which implementations work in which situations? I plan to investigate this within the context of Netlogo models, with mazes as the basis for experimental problems.

### Investigative Methods

Though I will be looking at this problem entirely with mazes, by carefully constructing and comparing experiments we can get an idea of which questions evolutionary programming (implemented in Netlogo) is best suited for. We can look at specific problem-solving – how many generations of evolving turtles does it take to reach the solution to a single randomly-generated maze, versus how many generations of entirely random turtles? On the methodology front, is it better to evolve a genome consisting of an explicit series of turns, or logic trees for what to do at an intersection? Furthermore – if we define fitness properly, as both a function of straight-line distance to the exit ignoring walls, and ticks left over after solving the maze, is it possible to evolve the shortest possible solution, and how much longer does it take than finding a solution that simply works, however inefficient? The answers to these questions should provide a large amount of insight into evolutionary programming.



^Jonathan Gardner



## Execution

### Maze Generation

In order to properly implement evolutionary maze-solving, a framework maze-generator needed to be made. It would have been possible to simply have pre-set mazes, or have the user be able to draw mazes, but this would have biased the mazes and interfered with data analysis as a result. I needed an unweighted generator of passages where every single cell could be accessed from every other cell (or, a *uniform spanning tree* generator)<sup>1</sup>. This left two options: Aldous-Broder, or Wilson's.

Aldous-Broder, though generally less efficient than Wilson's at filling out a grid completely, is much easier to implement in code, and thus was the algorithm I decided to go with. Its rules are simple:<sup>1</sup>

1. *Choose a vertex. Any vertex.*
2. *Choose a connected neighbor of the vertex and travel to it. If the neighbor has not yet been visited, add the traveled edge to the spanning tree.*
3. *Repeat step 2 until all vertexes have been visited.*

This can be very easily implemented in Netlogo if a 'grid' of patches is created, the grid-line patches are treated as edges, and the non-grid-line patches are treated as vertices. Setting the first randomly-chosen patch as the entrance and the last-visited patch as the exit creates mazes as random as the RNG. It also results in passages twice as long as they should be, when edges are transformed into traversable vertices, but this can be accounted for by simply having any entity inside the maze move forward two patches at a time.

### Defining Evolutionary Parameters

It is possible to implement evolutionary programming for generalized maze solving in Netlogo – the main inspiration for my project did so.<sup>2</sup> However, this is both unwieldy and nonsensical to implement (before realizing Maze Rules had been ported to 4.1, I tried to translate it from 3.0 to 4.1 and could not even begin to comprehend the code). It results in a more convoluted version of the left-hand rule (or right-hand rule).

The other possibility for maze-solving is to create a program that breeds turtles designed to solve *specific* mazes. This problem can be examined much more in-depth – is an evolutionary algorithm suited for solving any mazes? Are there certain maze layouts which are more difficult for evolutionary algorithms to solve? This is the approach I chose to take.

### Implementation of Genomes and Fitness

To best approach this problem, I settled on genomes as discrete maze-solving directions: each turtle would have a series of left, right, and no turns encoded into its genome, which it would follow explicitly - ending once it reached either the exit or the end of its list. This also made for rather easy splicing, by simply looping over the longer genome of two parents, and giving a 50% chance of replacing each item with one from the other parent's genome. I also added in a user-defined chance of random mutations at each step, either replacing an item with a random new one or removing an item entirely (the latter

significantly less likely). I settled on 1,000 generations per run as a round number which allowed more than enough time for evolution to kick in, but didn't take an unfeasibly long amount of time to run.

## Experimental Setup

To properly experiment on this model, a control group was necessary. In this case, I created a second model identical to the original, but without the code for breeding (*MazeRand*). On each successive generation, *MazeRand* simply used the code that the original model, *Maze*, used for the initial turtle population. Additionally, I needed to both maintain the randomness of the maze generator but be able to compare various methods over the same maze; this was solved by adding local randomness to the maze generation code, coupled with a slider to input maze seed values. Since the maze generation code in *Maze* and *MazeRand* is identical, the same seed creates the same maze in both models.

After initially running experiments over *Maze* and *MazeRand*, I realized that my genome splicing algorithm was faulty, and did not properly splice in all situations (it only spliced if parent one's genome was longer than parent two's). It is difficult to tell whether this code works properly or not simply by examining it, and I did not have time to test it extensively, but all errors I am aware of have been fixed.

I ran the following BehaviourSpace experiment over *Maze* three times:

**Mutation Chance** of 2%, 1%, .4%, .2%, and .1%

**Maze Seed** of 0-200, in intervals of 5 (41 random mazes)

As a control, I ran *MazeRand* over the same maze seeds three times.

## Results

Unfortunately, there was some data loss while running the above experiment. Any maze run which had no data attached to it was discarded, resulting in data for 37 mazes.

To most easily interpret the data as a whole, the best fitness from *MazeRand* was subtracted from each mutation chance run of *Maze*. This data was collated to yield the following tables:

**Mean**

Mutation Chance	2%	1%	0.4%	0.2%	0.1%
All Mazes	20.86486	17	7.567568	10.78378	-2.13514
Random < 400	29.2	23.48	11.16	16.04	-2.68

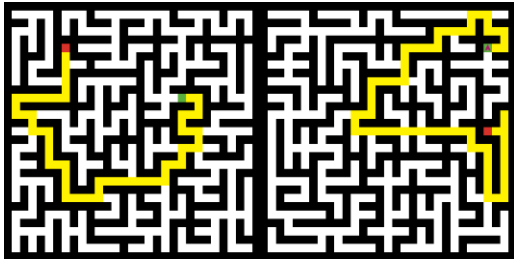
**Median**

Mutation Chance	2%	1%	0.4%	0.2%	0.1%
All Mazes	22	20	7	7	1
Random < 400	35	38	22	21	17

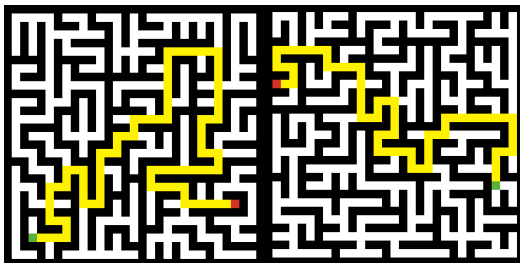
Random < 400 is the data for only when the best fitness of *MazeRand* was less than 400. This highlights a fairly interesting point: evolution is far better at solving longer mazes, on average, than it is at solving shorter mazes (it makes much more gain than randomness).

By delving into specifics a little more, the details of where this implementation fails and excels can be examined – as well as how mutation chance affects how turtles fare in various maze setups.

The following two mazes (40 and 90) resulted in fitness far below randomness:

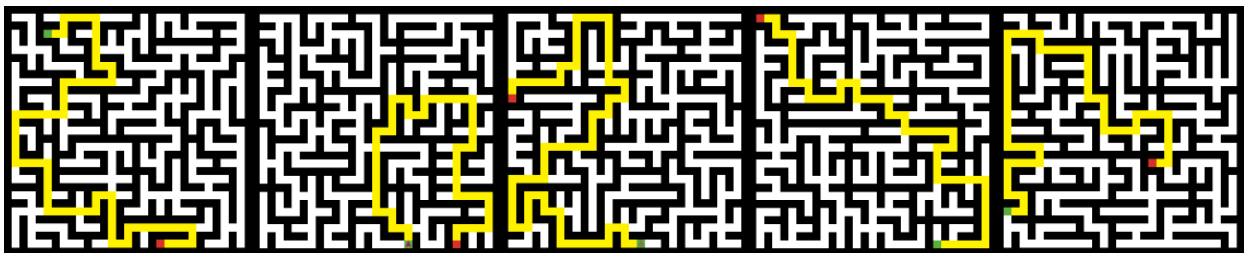


The following two mazes (130 and 65) resulted in fitness far above randomness:



The implications are fairly straightforward; evolution is set back significantly by dead ends that approach the exit without reaching it (though it is worth noting that every single maze was solved, even 130).

Finally, we can find which mazes various mutation chances perform best on. From highest to lowest mutation chance, they are (30, 165, 60, 135, 50):



Generally, the higher the mutation chance, the more tolerance for misleading dead-ends, but the more time it takes to solve a less complicated maze.

## Further Expansion

There are many different directions this model could be taken in – is the breeding algorithm truly as optimal as it could be? Variants of mutation could be added, or different turtles chosen to breed. Even further abstracted from this project, how does evolutionary programming fare with multiple exits, and greater rewards for reaching more than one of them? Any modifications that change which questions we are asking about evolutionary programming fall within the initial scope of this project.

1: <http://weblog.jamisbuck.org/2011/1/17/maze-generation-aldous-broder-algorithm>

2: <http://www.cs.northwestern.edu/~fjs750/netlogo/final/index.html>





Jonathan Gardner v

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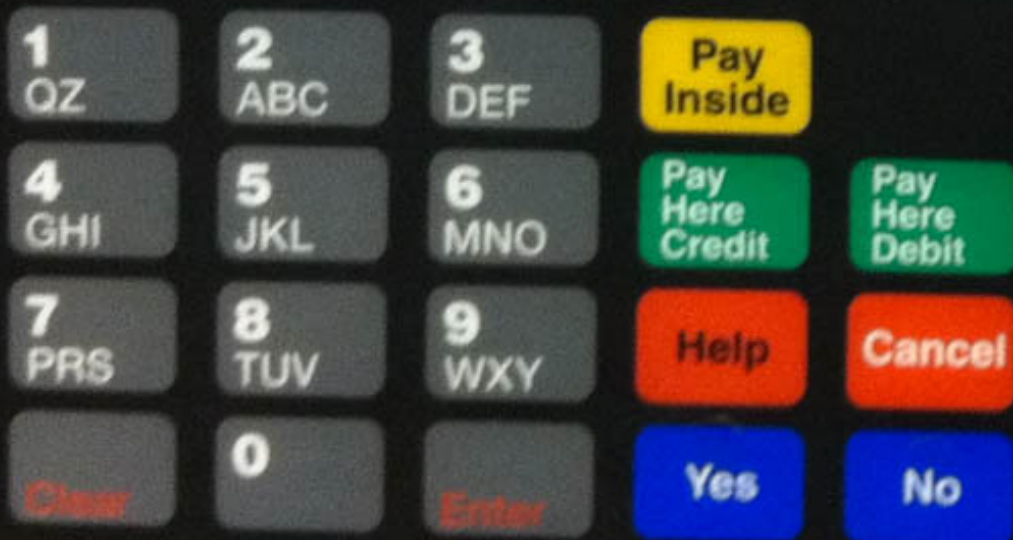




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